



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,314	10/16/2003	Yi-Hsun Wu	24061.27 / TSMC2002-1168	7810
42717	7590	06/28/2004	EXAMINER	
HAYNES AND BOONE, LLP 901 MAIN STREET, SUITE 3100 DALLAS, TX 75202			WILSON, SCOTT R	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 06/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/687,314	<b>Applicant(s)</b> WU ET AL.	
	<b>Examiner</b> Scott R. Wilson	<b>Art Unit</b> 2826	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) ☒ Responsive to communication(s) filed on 03 February 2004.

2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) ☒ Claim(s) 1-22 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.

6) ☒ Claim(s) 1,2,4-7,11-13 and 15-22 is/are rejected.

7) ☒ Claim(s) 3,8-10 and 14 is/are objected to.

8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on 03 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All    b) ☐ Some \* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2/3/04.

4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION*****Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "first and second electrodes separated by a dielectric material" of claim 1 must be shown or the feature(s) canceled from the claim(s). In addition, "a first finger having first and second electrodes separated by a thin oxide material", "a second finger having third and fourth electrodes separated by a thin oxide material", and "a drain positioned proximate to the first and third electrodes, and separated from the first source by the first electrode and from the second source by the third electrode" of claim 12 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 2826

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Ahn. Ahn, Figure 2, discloses a deep submicron electrostatic discharge (ESD) protection structure which would in part comprise first and second electrodes, which would enable electrical connection to the source and drain (126a and 126b), separated by a dielectric material, a source (126a)(col. 4, lines 3-4) positioned proximate to the first electrode, and a drain (126b)(col. 4, lines 3-4) positioned proximate to the first electrode and covered by a silicide layer (128)(col. 4, line 29), wherein the silicide layer enhances ESD protection provided by the structure (Abstract).

Claim 1 is further rejected under 35 U.S.C. 102(b) as being anticipated by Gadepally. Gadepally, Figure 3, discloses a deep submicron electrostatic discharge (ESD) protection structure which would in part comprise first and second electrodes, which would enable electrical connection to the source and drain (16 and 18), separated by a dielectric material, a source (18)(col. 1, lines 28) positioned proximate to the first electrode, and a drain (16)(col. 1, lines 27) positioned proximate to the first electrode and covered by a silicide layer (34)(col. 1, line 63), wherein the silicide layer enhances ESD protection provided by the structure (col. 2, line 6).

Claim 1 is further rejected under 35 U.S.C. 102(b) as being anticipated by Avery et al.. Avery et al., Figures 3 and 4, discloses a deep submicron electrostatic discharge (ESD) protection structure which would in part comprise first and second electrodes, which would enable electrical connection to the source and drain, separated by a dielectric material, a source (SOURCE) positioned proximate to the first electrode, and a drain (DRAIN) positioned proximate to the first electrode and covered by a silicide layer (418<sub>D</sub>)(paragraph 0065), wherein the silicide layer enhances ESD protection provided by the structure (paragraph 0065).

As to claim 2, in light of the lack of illustration of the dielectric material (see drawing objection), or description of the dielectric material in the specification, and since the claimed thickness is so small, the examiner takes the gate oxide layer to be within the scope of the dielectric material. Avery et al.,

Art Unit: 2826

discloses (paragraph 0079) that the gate oxide is less than 70 angstroms, which is within the scope of being less than 25 angstroms.

As to claim 4, Avery et al. discloses (paragraph 0014 and 0048) that the silicide layer is a metal silicide.

As to claim 5, Avery et al. discloses (paragraph 0014 and 0048) that the metal silicide may be formed with tungsten or cobalt.

As to claim 6, Avery et al. discloses (paragraph 0011) that the structure may be an n-channel MOSFET.

As to claim 7, Avery et al., Figure 7, discloses an embodiment comprising a p-channel MOSFET (paragraph 0073).

As to claim 11, Avery et al. discloses (paragraph 0066) a transition time from breakdown to snapback, wherein the silicide layer shortens the transition time.

Claim 12 is rejected under 35 U.S.C. 102(b) as being anticipated by Avery et al.. Avery et al., Figures 3 and 4, (paragraph 0065) discloses a deep submicron electrostatic discharge (ESD) protection structure for a deep submicron integrated circuit, the structure comprising a first finger (421) having first and second electrodes, shown below (421), separated by a thin oxide material, and a first source (418<sub>s</sub>) positioned proximate to the first electrode and a second finger (one of the other 12 neighboring fingers) having third and fourth electrodes separated by a thin oxide material, and a second source positioned proximate to the third electrode, a drain (421<sub>D</sub>) positioned proximate to the first and third electrodes, and separated from the first source by the first electrode and from the second source by the third electrode, and a silicide layer (418<sub>D</sub>) in direct contact with the drain.

As to claim 13, in light of the lack of illustration of the dielectric material (see drawing objection), or description of the dielectric material in the specification, and since the claimed thickness is so small, the examiner takes the gate oxide layer to be within the scope of the dielectric material. Avery et al., discloses (paragraph 0079) that the gate oxide is less than 70 angstroms, which is within the scope of being less than 25 angstroms.

Art Unit: 2826

As to claim 15, Avery et al. discloses (paragraph 0014 and 0048) that the silicide layer is a metal silicide.

As to claim 16, Avery et al. discloses (paragraph 0014 and 0048) that the metal silicide may be formed with tungsten or cobalt.

As to claim 17, Avery et al. discloses (paragraph 0066) a transition time from breakdown to snapback, wherein the silicide layer shortens the transition time.

As to claims 18-22, the device of Avery et al. would necessarily have to be formed in order to function, so that the method comprising the formation of the device is inherent in the device structure itself.

***Allowable Subject Matter***

Claims 3 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the cited references expressly disclose the dimensions of the channel.

Claims 8-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the cited references expressly disclose a floating drain.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott R. Wilson whose telephone number is 571-272-1925. The examiner can normally be reached on M-F 8:30 - 4:30 Eastern.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2826

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

srw  
June 16, 2004

**NATHAN J. FLYNN**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2800**

